Tanta University

Department: Electronics and Electrical Communication
Programme: Under-graduate (Mid-term)
Total Marks: (30) Marks

Faculty of Engineering

Course Title: Satellite Communication Systems
Date: 12/11/2016

Course Code: EEC4122
Allowed time: 1 hr.

Year: 4th Year
No. of Pages: (2)

Remarks: (assume any missing data)

Question No. 1 : (13) Marks

a- Explain briefly why satellite uplink frequency is always higher than downlink frequency. (3) Marks

b- Mention the three conditions required for an orbit to be a Geo-stationary orbit. (3) Marks

c- An earth station at latitude 30°S is in communication with an earth station on the same longitude at 30°N, through a geostationary satellite. The satellite longitude is 20° east of the earth stations.

i. Calculate the antenna-look angles for each earth station and, (4) Marks

ii. The round-trip time, assuming this consists of propagation delay only. (3) Marks

Question No. 2 : (17) Marks

a- Aided with the table below and the following two-line elements for Satellite NOAA 18

```
NOAA 18
1 28654U 05018A   16311.53285245  .00000040  00000-0  47310-4 0  9998
2 28654  99.1961 322.1608 0013952 339.7282  20.3333 14.12312933590825
```

Determine:

i. The Keplerian element set assuming ideal sphere at epoch time. (6) Marks

ii. Apogee and Perigee heights. (2) Marks

iii. Whether or not this orbit is sun-synchronous? (2) Marks

iv. If not exactly sun-synchronous, how to modify it to sun-synchronous without changing its shape? (1) Marks

b- Explain briefly why Rain attenuation is higher for Horizontal Polarization compared to Vertical Polarization (3) Marks

c- Explain briefly the following terms: (3) Marks

i. Line of Apsides

ii. Retrograde Orbit

iii. Atmospheric drag

Line no.	Columns	Description
1	3–7	*Satellite number*: 25338
1	19–20	*Epoch year* (last two digits of the year): 00
1	21–32	*Epoch day* (day and fractional day of the year): 223.79688452 (this is discussed further in Sec. 2.9.2)
1	34–43	*First time derivative of the mean motion* (rev/day^2): 0.00000307
2	9–16	*Inclination* (degrees): 98.6328
2	18–25	*Right ascension of the ascending node* (degrees): 251.5324
2	27–33	*Eccentricity* (leading decimal point assumed): 0011501
2	35–42	*Argument of perigee* (degrees): 113.5534
2	44–51	*Mean anomaly* (degrees): 246.6853
2	53–63	*Mean motion* (rev/day): 14.23304826
2	64–68	*Revolution number at epoch* (rev): 11,663

You may use the following data (if needed)

- $K_1 = 66063.17\ Km^2$
- $n = n_0\left[1 + \frac{K_1(1-1.5\sin^2 i)}{a^2(1-e^2)^{1.5}}\right]$
- $K = \frac{nK_1}{a^2(1-e^2)^2}$
- $\frac{d\Omega}{dt}_{sunsynch} = 0.9856°/day$
- $\mu = 3.986005 \times 10^{14}\ m^3/s^2$
- $R = 6371\ Km$

The end of questions

Good luck
Dr Amira Ashour (Coordinator of the Course)
Dr Mahmoud Selim

Tanta University | Department: Electronics & Electrical Communications | Faculty of Engineering

Total Marks: (15) Marks

Course Title: Data Security (Elective Course 3)	Course Code: EEC4126	Year: 2016/2017
Date: 13/11/2016	Allowed time: (1) hrs.	No. of Pages: (1)

Question No. 1 : **(10 Marks)**

a- Define the following terms: (2 Marks)

- Cryptology.
- Polyalphabetic Cipher.
- Masquerade.
- Breach

b- Complete the following sentences: (2 Marks)

- The permutation is done on the whole plaintext to create the whole ciphertext in the.....ciphers.
- In .....cipher, the ciphertext is created by reading the pattern row by row.
- .....is a possible danger that might exploit a vulnerability to break security.
- An attacker must have.....which means a reason to perform an attack.

c- Discuss why double DES is insecure and what makes 3DES compatible with single DES. (1.5 Mark)

d- Draw the figure of one round in DES encryption & decryption. (1.5 Mark)

e- Single letter frequency information in the monoalphabetic cipher is completely counter measured with homophonic substitution. Explain how? (1.5 Mark)

f- Which mode of the block cipher operation is suitable for the secure transmission of a single value as an encryption key? Give reasons for your answer. (1.5 Mark)

Question No. 2: **(5 Marks)**

a- Encrypt the word: "Engineer" with the playfair cipher of a key word "happy". (1.5 Mark)

b- Eve has intercepted the ciphertext "JCRRAFCA" with the shift cipher. Show how she can use a brute-force attack to break this cipher. (2 Marks)

c- Encrypt the message: "happy new year" by using a transposition cipher with the following key:

3	2	4	1
1	2	3	4

(1.5 Mark)

Good luck

Dr. Roayat Ismail (Coordinator of the Course)

Tanta University
Faculty of Engineering
Electronics and Electrical Communications Dept.

Mid-term exam (2016/2017)
Antenna and Wave Propagation

4th year

Answer the following questions: **(Time: 1 hour)**

Question (1)

(a) For $(5\lambda \times 4\lambda)$ rectangular aperture antenna, if the electric field is distributed as shown in figure (1).

1. **Determine** and **sketch** the E-plane and H-plane patterns.
2. **Derive** the antenna directivity.

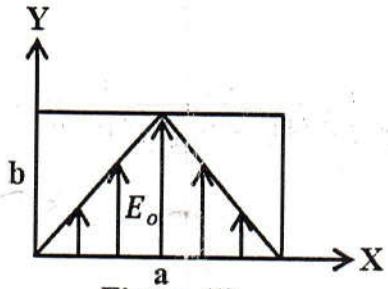

Figure (1)

Question (2)

(a) **Compare** between the null-to-null beamwidth of a rectangular aperture antenna of dimensions $(a \times a)$ and a circular aperture antenna of radius $r = a$.

(b) Consider N=6 dipole elements separated by $d = \lambda/2$. All the elements are fed from a common generator with transmission lines of equal lengths. If the dipoles are placed on Z-axis and the elements are oriented in Y-axis.

1. Determine the array factor.
2. Determine the progressive phase shift α
3. Sketch the total field pattern.

Tanta University | Department: Prod Engineering and Mech Design Dept | Faculty of Engineering
Total Marks: **10 Marks**

Course Title: **Project Management**	Course Code: **EEC41H5**	Year: **4th EEC41H5 Year**
Date: **17- 11- 2016[Mid-Term Exam]**	Allowed time: **1.15 Hr**	No.of Pages: **(1)**

اجب عن اربعة فقط من الأسئلة الاتية موضحا اجابتك بالرسم التوضيحى كلما امكنك ذلك:-

السؤال الأول:-

ا- عرف الادارة، وعرف المشروع، وعرف ادارة المشروعات، وما هى الخصائص المميزة للمشروع؟.
ب- ما هى انواع المشروعات؟ وما هى عوامل نجاح المشروعات بشكل عام؟ وما الأسباب الأساسية لفشل المشروعات؟

السؤال الثانى:-

ا- عرف دورة حياة المشروع(أو دورة تطور المشروع)؟ وأذكر بعض خصائص دورة المشروع مع رسم توضيحى يبين تغير الأفراد مع دورة حياة المشروع؟.
ب- تكلم باختصار عن مرحلة دراسة المشروع؟ و بين أهداف المشروع؟ و ما هى خصائص أهداف المشروع؟.

السؤال الثالث:-

ا- عرف كلا مما يلى:-
التخطيط – الخطة – الموازنة – التنفيذ – المهمة – النشاط – ادارة التكامل – ادارة الجودة .
ب- أذكر ما الهدف من ادارة المشروع؟ وما هى مزايا ادارة المشروعات؟.

السؤال الرابع:-

ا- عرف ما معنى تخطيط المشروعات؟ واذكر أهم المهام فى عمليات التخطيط، والرقابة للمشروع؟.
ب- ما هى العناصر اللازمة لاعداد خطة المشروع؟ وما هى خطة المبيعات للمشروع؟ وما هى خطة التسويق للمشروع؟.

السؤال الخامس:-

ا- ما هى أبعاد العملية الادارية وما هى وظائف المديرين فى ادارة المشروعات؟
ب- بين كيفية تخطيط المدير لعمله اليومى؟ وما هى وسائل تحقيق خطة العمل فى الادارة للمشروعات؟.

السؤال السادس:-

ا- عرف ما هى ادارة الانتاج؟ وما هى ادارة الانتاج والعمليات؟ وما هى أهداف الأداء فى ادارة الانتاج؟.
ب- ما هى الوظائف المتاحة فى مجال ادرة الانتاج؟ و ما هى العوامل المؤثرة على وظيفة ادرة الانتاج؟ وماهى وظائف نظام الانتاج؟ وبين ما هى مجالات اتخاذ القرار فى ادارة الانتاج؟.

انتهت الأسئلة

مع اجمل التمنيات بالتوفيق والنجاح

{{Dr Eng.: Alaa-Eldin A. El-Hammady}}

Tanta University

Department: Electronics & Electrical Communications

Faculty of Engineering

Total Marks: (15) Marks

Course Title: Telecommunication Networks
Date: 15/11/2016

Course Code: EEC4124
Allowed time: (1) hrs.

Year: 2016/2017
No. of Pages: (1)

Question No. 1 :

(9 Marks: 1.5 for each item)

a- Compare between LAN and WAN [geographic area-ownership-transmission rate-applications].

b- Show with drawing only how to connect five workstations in a hybrid topology (a star backbone with three bus networks) then mention the advantages and disadvantages of star and bus topology?

c- Virtual Private Network (VPN) combines the advantages of both private and public network. Explain how?

d- Differentiate between virtual circuit packet switching and datagram packet switching.

e- What are the three methods of wireless wave propagation? Give an example for each.

f- Design a simple two-stage N×N switching network with full availability, full connectivity and nonblocking. What is the disadvantage of this network?

Question No. 2:

(6 Marks: 1.5 for each item)

a- A message of 6000 bytes is transferred over a communication network with 60 km hop distance and 3 intermediate nodes. The data rate on all links is 96kbps. The propagation speed on any link is 250m/μs. The packet size is 250 bits and 50 bits as a header. The set-up time is 0.2 sec. The processing at each node time is 0.025 sec, while the average queuing delay at each node is 0.15sec. Compare between the end-to-end delay time for circuit and datagram switching techniques.

b- The bandwidth of a subscriber line is 4 kHz for voice or data. The bandwidth of this line for data transmission can be up to 56,000 bps using a sophisticated modem to change the digital signal to analog. What is the max bit rate if the signal level is 2 (binary signal) under noiseless condition?

c- For a non-blocking (2048x2048) switching network, calculate the minimum number of switching elements capacity for three-stage switching.

Good luck

Dr. Roayat Ismail (Coordinator of the Course)

Tanta University
Faculty of Engineering
Quiz No. 1 (Time allowed: 30 minute.)

4th year Electronics & Comm.
Telecommunication Networks
25/10/2016

1. Answer the following:

a) Define the following terms:
   - Network.
   - Virtual Private Networks (VPN).
   - MAN (Local Area Network).
   - Transmission delay.

b) What are the advantages and disadvantages of star topology and mesh topology?

c) Compare between strengths and weaknesses of both message switching and packet switching.

d) Draw the timing diagram of datagram packet switching and deduce the total delay?

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2. It is required to transfer a message with size 100 Kbytes on a communication network with 4 nodes, from the user to the server. The data rate for all links is 3 Mbps. The packet size is 1000 bits. The setup time is 0.12 sec, with negligible processing time at each node, while the average queuing delay at each node is 0.2 sec. The propagation speed over a link is 300 m/μsec, where the hop distance is 100 km.
   Calculate the end-to-end delay time for the following:
   - Circuit switching network.
   - Datagram packet switching.

Good Luck

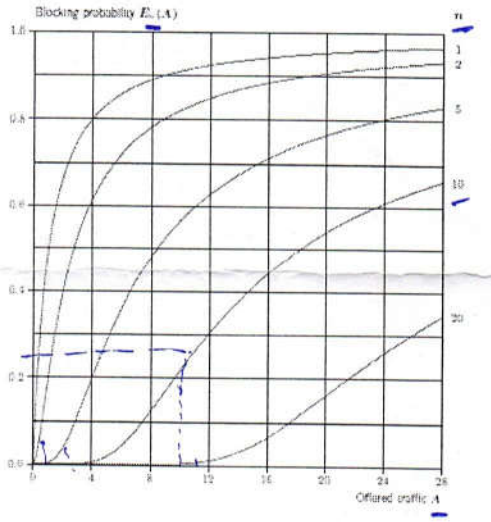
Tanta University
Faculty of Engineering
Quiz No. 2 (allowed Time: 1 Hour)

4th year Electronics & Comm.
Telecommunication Networks
24/12/2016

Answer The Following:

1) Suppose a call center PBX has 10 phone lines, receives 480 calls per day, and the average duration of a call is 15 minutes. Calculate
   a) Blocking Probability
   b) GOS and comment on customer's satisfaction
   c) Channel Utilization
   d) Time congestion during busy hour
   e) Number of blocked calls with last three hour

2) Recursive iterations can be used to figure A from a given value of E and a desired value of P_B as below. Suppose that a call center receives 300 calls per hour, the average service time is 2 minutes, and the center would like a blocking probability value of 0.25. Calculate
   a) Carried traffic in Erlang and CSS
   b) Number of channels of the system
   c) Describe how to decrease the $P_B <$ 20 % with minimal cost



3) Consider a historical data of a network as in the table shown, use this table to make forecasting in 2020 of expected subscribers density by using the mathematical models:
   a) Linear model
   b) Exponential model
   c) Which model is preferred and why ?

At end of year	2010	2011	2012	2013	2014	2015
Object Data	400	440	495	540	600	680

Best Wishes of Success,